

## Dynamic Design: Launch and Propulsion

## You Get What You Pay For

### STUDENT ACTIVITY

#### BACKGROUND

In this activity you will plan a budget for the construction and launch of your water rocket. Each group will be given a budget of \$150,000 and an approved subcontractor list that identifies materials and their costs for your consideration. Use your funds wisely and keep accurate records of all you spend. Your group must have a minimum of \$20,000 for the last two launches to pay for the use of the launcher. Your group must also have money budgeted for fuel costs (Fuel will cost \$30 per milliliter). If your group has less than \$20,000 at the time of launch, your group will not be permitted to launch and, will be disqualified. Complete the following activity in your design group to create a budget that helps you to manage your funds.



#### Group Discussion:

Think about any experiences you have had in managing money. Describe your successes and failures in the space below and share with your group.

**Part 1: Final Launch Budget**

Below is the list of required materials needed for the final launch. Using a spreadsheet or balance sheet plan the funds you would like to allocate for the first launch. You may use materials found on the Approved Subcontractor List in addition to the materials listed below. Create a budget for the final launch and testing. The budget for final launch should total at least \$20,000.

- One or more 2-liter plastic soft drink bottles
- Water for fuel
- Safety goggles
- Glue or tape
- Cardboard or thick paper
- Modeling clay
- Scissors
- Pens and decorating supplies
- Materials for protecting the payload
- Use of launcher

**Part 2: Expert Group Budget**

Each person in your home group should be allotted a certain budget that they can spend in their expert groups. The payload and propulsion experts should be given at least \$5,000 to purchase a “naked” bottle for their tests. Launch pad fees will not be assessed during the expert phase. Create a budget for each expert team. The expert groups will use funds for testing different aspects of the rocket. Since it is unknown at this time exactly what costs are, you will need to estimate. Use the expert group sheets to help estimate your group’s contribution to the expert groups.

Expert Group Budget	
Propulsion	
Nosecone	
Fin shape/size	
Fin number/placement	
<b>Total</b>	



### Approved Subcontractor List

Subcontractor	Materials	Price Per Unit
Bottle Neck Engine Corporation	2 L Bottle	\$20,000 per bottle
Genesis Launch Center	Use of Launcher and Pump	\$10,000 per launch
H <sub>2</sub> O Unlimited	Fuel	\$30 per mL.
Stick To It Tape and Glue	Duct Tape	\$5,000 per 5 cm.
	Strapping Tape	\$5,000 per 5 cm.
	Masking Tape	\$2,500 per 5 cm.
	Cellophane Tape	\$1,000 per 5 cm.
	Dental Floss	\$500 per 5 cm.
	Glue Stick	\$2,000 per container
	Hot Glue Stick	\$5,000 per stick
	Low-Temp. Glue Gun	\$1,000 per rental
Toilet Tubular	Toilet Paper Tubes	\$50 per tube
	Wrapping Paper Tubes	\$100 per tube
	Paper Towel Tubes	\$150 per tube
Write-On Paper	Cardboard	\$2,500 per sheet
	Construction Paper	\$1,500 per sheet
	Egg Containers	\$1,000 per 6 count
	Popsicle Sticks	\$50 per stick
	Poster Board	\$10,000 per sheet
	Sand Paper	\$5,000 per sheet
	Typing Paper	\$1,000 per sheet
	Tag board	\$3,000 per sheet
Put it Together Construction Materials Limited	Clay	\$500 per 100 grams
	Cotton Balls	\$50 per ball
	Graduated Cylinders	\$10 per cylinder
	Hole Punch	\$10 per punch rental
	Meter Sticks	\$10 per stick
	Ruler	\$5 per ruler
	Safety Goggles	Complimentary
	Scissors	\$5 per pair
	Small Washers	\$5 per washer
	Spring Scale	\$10 per scale
	Tape Measure	\$50 per tape rental
	Tennis Ball	\$100 per ball
	Long Stick	\$10 per stick
	Decorative Decals	\$50 per decal
	Felt-Tipped Pens	\$50 per pack
	Magic Markers	\$10 per marker
	Paints	\$50 per color